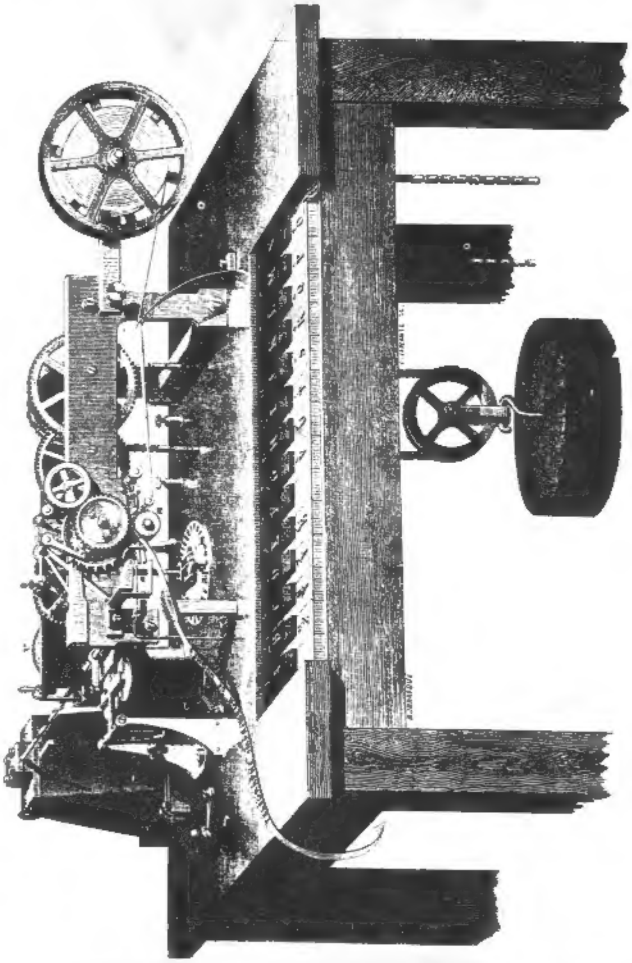
RTTY



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NEWS OF AMATEUR RTTY

JUNE 1966
30 Cents
Vol. 14, No. 6

HORSE TRADES

This page of the Bulletin is for use of amateurs who have RTTY EQUIPMENT FOR SALE OR TRADE and those looking for equipment to buy or trade. It is a free service and may be the means of getting someone on the air.

RTTY, INC.
372 Warren Way
Arcadia, California 91006
Return Postage Guaranteed

WANTED: I need information on converting SB 400 (HEATH) to FSK and on TT/L Mainline FSK demod. Will pay reasonable fee for reprints or infor. WA2NDJ, 76-13 251 Street, Bellerose, N.Y. 11426.

TRADE/SWAP: Three element Tribander, 10, 15, 20 mtrs., by Hornet with Specs for a Model 14 TD complete. K9IWF, 711 East Olive Street, Bloomington, Illinois 61701, Phone 309-823-2455.

FOR SALE: 44 and 88 mhy toroids, five for $2.50. 255A polar relay sockets 75¢,. Polar relays, type 255A $2.00. Snyc motors, $10.00. W5EJV, 804 Shadt Lane, Dallas, Texas 75208.

WANTED: FOR CASH, SU-401, sub unit power supply for AN/URA-8A/CV-89, W9GDV, 2304 13th Street, Winthrop Harbor, Illinois.

WANTED: CV-89 or CV-57 COMPLETE with cables. W8MSG, 3479 Kersdale Road, Cleveland, Ohio 44124.

WANTED: TEST EQUIPMENT AND PARTS MARKED URN-3, GRN-9, GRA-34, TS-890, TS-891, MX-1627, MX-2229, OS-54. Have TT projector unit TT-71/UG, motors, relays, TT test sets. Also have BRAND NEW SWAN, DRAKE, CLEGG, GONSET, ETC. W6ATC, Harru, 3101 Pico Blvd., Santa Monica, Calif. 90405. Phone 870-0216.

WANTED: Complete Teletype Model 19 set. Offers from area 100 miles. WA2DCA, P.O. Box 148, Moorestown, N.J. 08057.

FOR SALE: Electrocom Industries TK-100, networks FN 1700-425, FN 2030-95, FN 2082-43. Eico Audio Oscillator. 1180 CAP. DEC. Millen 90672 Ant. Bridge 90651 GDO. TRADE KWM-2A, WATERS 340A notch filter, 136B2 IF noise blanker, PM-2, 312B-5, want two R-390A/ one 51S-1. WA5CON, 912 Magnolia Avenue, Hubbard, Texas 76648.

FOR SALE: Boehme Morse Tape Reader and motor drive. McElroy perforator. 25 rolls of tape. $45.00 LOCAL SALE ONLY. John Riley, 914 North Cordova Street, Burbank, Calif. 91505, phone 845-3880.

FOR SALE: Two CV-57/URR., $90.00 or $50.00 each. Two automatic carriage return and line feed kits for Model 15, $20.00 each. KP4GN, P.O. Box 532, Guayama, P.R. 00655.

FSK KEYERS

One of the most frequently asked questions in the letters received by RTTY is "How can I FSK my Brand X transmitter?" Looking over the past 13½ years of RTTY's, many FSK circuits are to be found. To be sure, many of the circuits are for one type of transmitter, but a careful review of the circuit details will permit one to adapt it to his own needs. A few of the circuits in past issues are printed as an example of what general types of circuits can be used successfully.

There are in general, three types of circuits, each with modifications to obtain certain advantages.

The Reactance modulator, which uses a tube or equivalent circiut to add capacity or inductance to a tuned circuit. This is similar to the sync circuits used in TV receivers. A good discussion of this type of circuit will be found on page 271 of the 1965 ARRL hand book. A. F. Input is shown in the hand book, but one can substitute DV voltages, keyed by your keyboard in its place and obtain FSK. This is the method used in the O-5B/FR exciter which is to be found in surplus at times. Several other surplus exciters use this type of shifter, hetrodyned against a crystal to obtain stable FSK at a given frequency.

The Diode modulator is the most widely used circuit at the present time. It also has different types of operation, such as the Shift-Pot version as well as the Saturated diode version. One such diode keyer was printed in RTTY for April 1953, in an article by Herbert Hoover, Jr., W6ZH. The article describes a circuit developed in United Geophysical's Research Labs for seismic recording use, and is covered by U.S. Patents Nos. 2,559,023 and 2,588,551. The original article is copied here:

METHODS OF FREQUENCY SHIFT KEYING CRYSTAL OR VARIABLE FREQUENCY OSCILLATORS

W6ZH — K6EV

A number of schemes have been proposed for frequency shift keying the oscillator of a transmitter operated by teletype. The method outlined below will shift the frequency of either a crystal or VFO with good stability and a wide range of adjustment.

The schematic circuit is shown in Figure 1. A pair of crystal diodes are connected in series with a small condenser C1 across the tank circuit of a variable frequency oscillator (1). If the control voltage Ec is made sufficiently high (above approximately 22 volts in this instance) the diodes will be biased beyond the point where they will rectify any RF. Thus, if the diodes are effectively beyond cut-off, the condenser C1 has no practical effect upon the frequency. As the control voltage Ec is gradually reduced, the diodes will begin to rectify the peaks of the RF appearing across the tank circuit. They will then present a progressively lower resistance from C1 to ground, until finally C1 is effectively in parallel with the tank circuit and the frequency is correspondingly reduced.

The advantage of this circuit, over most of the on-off diode switching schemes, is that a smooth variation of frequency can be obtained over the entire range of the control. The circuit was originally developed as an FM modulator, and excellent NBFM operation on the amateur bands can be obtained by minor changes in the FSK circuit outlined later.

In the circuit shown, the frequency shifting condenser C1 is not critical and a suitable size of fixed condenser can be soldered permanently into the circuit. The variation of frequency is then accomplished entirely in the DC control circuit to the diodes. Condenser C1 should be sufficiently large so that an ample shift can be obtained at the lowest frequency (3.5 mc) that will be transmitted. The control voltage can then be backed off when the output of the oscillator is multiplied for operation to the higher frequency bands.

The circuit can be applied to almost any existing crystal or variable frequency oscillator with a minimum of fuss and bother, and with the frequency shift control brought out to a convenient point. One example of this application is outlined in detail below.

A surplus BC-221 type frequency meter makes an ideal VFO for FSK operation. It has excellent frequency stability and is easily calibrated. Figure 2 shows how the circuit is applied. The condensers, diodes and resistors are soldered with short, rigid leads directly to the contacts on the bottom of the oscillator tube socket and to nearby lugs on the chassis.

Type IN38 diodes are used in preference to IN34, as the former have a considerably higher back resistance. The two .005 mfd. condensers C2 and C3 and the 15,000 ohm resistance R2 form a low pass filter to keep keying transients away from the oscillator circuit and to prevent RF from getting into the FSK keying leads.

The voltage divider comprising the 100,000 ohm and 20,000 ohm resistors R3 and R1, between the stabilized 150 volt supply and ground, places approximately 25 volts of positive bias on the diodes. If they are connected into the circuit with their polarity as indicated, they will remain beyond the cut-off condition while the circuit is not being keyed. By taking this precaution the original calibra-

Continued . . .

CIRCUIT DIAGRAMS OF FSK KEYING CRYSTAL OR VFO

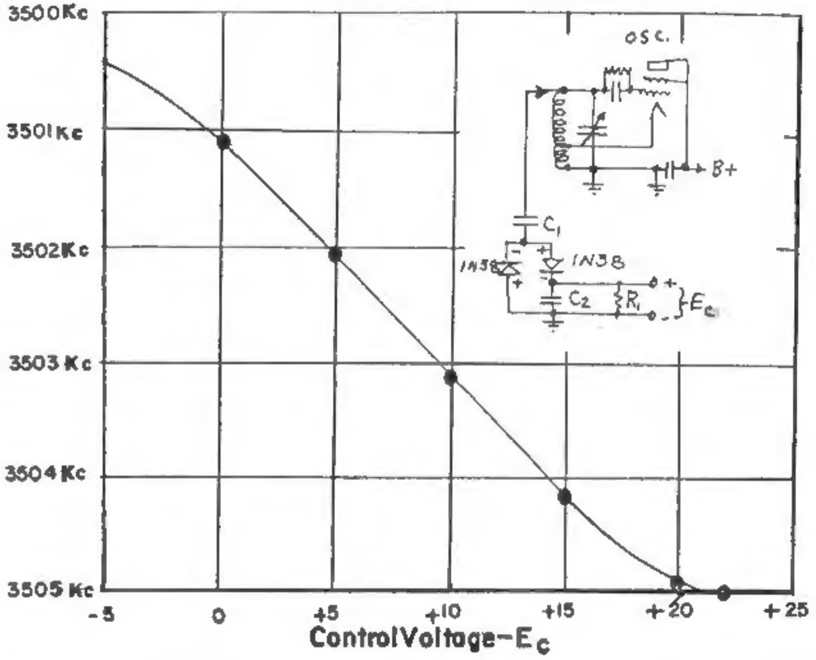

FIGURE 1—The Schematic Diagram of the Frequency Shift Circuit is shown as applied to a Variable Frequency Oscillator. The curve of frequency versus control voltage Ec applied across the load resistor R1 was obtained after modifying a BC-221-Q Frequency Meter as shown in Figure 2.

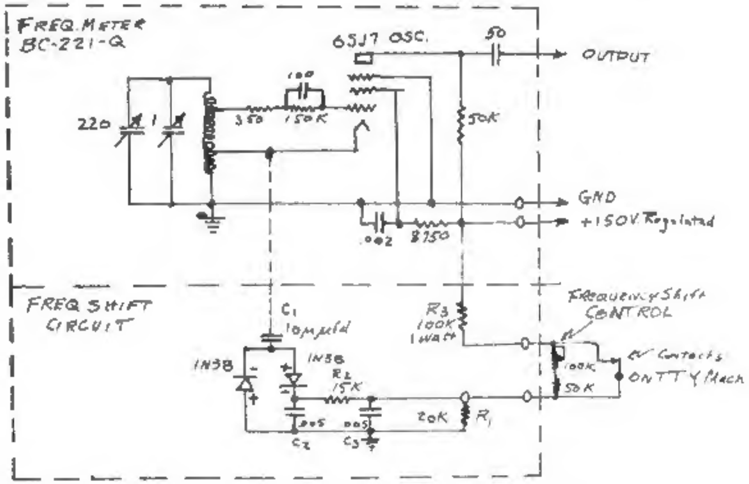

FIGURE 2—Frequency Meter BC-221-Q modified for Frequency Shift Keying. Added parts should be mounted directly on the oscillator tube socket. Connections shown are for direct keying by teletype keyboard contacts (normally closed).

(More Diagrams on Next Page)

FSK Keyers (Continued) . . .

tion of the instrument is undisturbed and the over-all stability is improved.

The stability of the oscillator is further improved by connecting the frequency shifting network between the cathode tap and ground, rather than across the whole tank circuit. With a 10 mmf ceramic condenser in this position a smooth and stable frequency shift of several thousand cycles is obtained at the fundamental frequency of the oscillator. The plotted curve of frequency versus control voltage Ec, applied across the 20,000 ohm resistor R1, is shown on the graph in Figure 1. While this curve applies only to the particular oscillator shown in Figure 2, in conjunction with the other circuit constants indicated, it is nevertheless typical of the results that can be expected under similar conditions. In the above instance the range of control voltage that was used for frequency shift keying with teletype was made adjustable between approximately 14 and 20 volts, and the resistance value in the potentiometer circuits were laid out accordingly.

The control circuit shown in Figure 2 is adaptable for direct keying from the contacts on the teletype keyboard. On the other hand, if keying is controlled from the back contacts of a keying relay, which is often desirable, the circuit of Figure 3 should be employed. This arrangement will again place the mark and space frequencies in their proper relationship and provide an equally wide adjustment of the frequency shift. When either of these circuits are applied to other oscillators, some changes may be required in the values of the fixed and variable resistors in order to spread the desired amount of frequency shift over the full range of the potentiometer. The modification to suit individual requirements is not difficult. The Collins type VFO may require a larger condenser C1 than was necessary in the BC-221-Q.

Excellent NBFM operation can be obtained from this circuit. Extreme stability of the oscillator is not so important in NBFM as in FSK, so the 100,000 ohm voltage divider R3 is disconnected, and the diodes are allowed to develope their own biasing voltage across the 20,000 ohm load resistor R1 by rectifying a part of the RF. The change in the control voltage for audio modulation may be obtained conveniently from a cathode follower, as shown in Figure 4. The 20,000 ohm load resistor R1 had previously been chosen so that a self-bias of about 5 volts was obtained. The cathode follower was then adjusted, by means of the deviation control, to swing the control voltage from approximately 10 volts negative to 20 volts positive. A low impedance driving source such as a cathode follower should be used, as the diodes present a non-linear impedance, particularly toward the negative end of the curve. A frequency deviation of 2.5 kcs each side of the carrier could be obtained with audio modulation of the BC-221-Q at 3.5 mcs. For greater amounts of deviation the condenser C1 should be made correspondingly larger.

The frequency shift circuit shown here has many applications besides those already outlined. It has the advantage of simplicity, economy and ease of adjustment without materially affecting the inherent stability of the oscillator to which it is applied.

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(1) See U. S. Patent Nos. 2,559,023 and 2,588,551 for a more comprehensive explanation of the circuit.

One reason for the use of saturated diode operation lies in the fact that when a diode is used as a switch for a small capacitor, it is also subjected to the RF voltage across which it is connected. Some of the earlier diodes had a low Max. Inverse Voltage specification, and as a result when used on a VFO which had say, 250 volts on its plate, the RF across the diode was above the Max. Inverse rating and caused heating which in turn changed the resistance of the diode at a given DC voltage. Hence, DRIFT. Currently many suppliers offer diodes with very high inverse voltages, so its only a matter of selecting the proper diode. The 1N34 which is shown in the W6ZH article was operating in a BC-221 frequency meter, and had very low voltage across the diode and caused NO DRIFT. With saturated diode operation, the voltages for either MARK or SPACE were at cut-off, or saturation operation, so with heating little change in resistance was noticed.

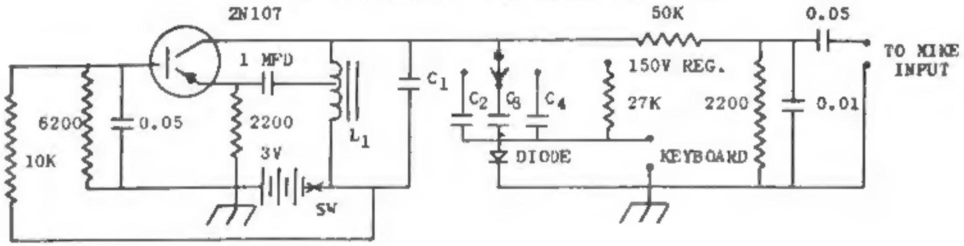
Still another version of the diode FSK keyer is the use of a Voltage-Variable Capacity which is described in the 1965 ARRL hand book on page 81. A DC voltage which is keyed by the RTTY Keyboard permits shifting from one frequency to another easily.

Then some amateurs use the AUDIO/SSB FSK method of generating FSK. Use is made of an audio oscillator which is frequency shifted by a diode or reactance modulator, and the audio feed into the microphone jack. Several factors must be considered when attempting to use this method. First, many of the SSB exciters will not meet FCC standards when applying a steady single tone, that is to say, the unwanted sideband, and carrier are not suppressed enough. This type of problem does not usually show up on voice, due to transient nature of voice signals, but with steady tone, it's another matter .Also, many finals for SSB will not stand steady key-down condition, such as FSK, where either one or the other tone is always present. Careful design and proper operating conditions will permit good clean FSK from audio input, but this method is hardly suggested for beginning amateurs on RTTY.

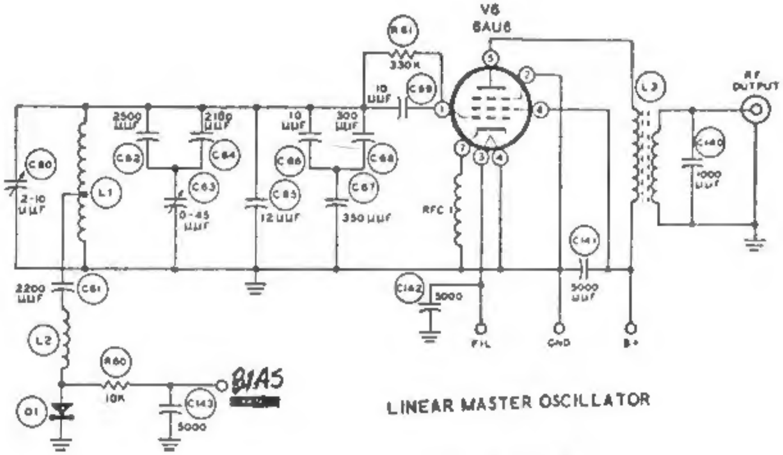
One additional comment may be in order, amateur standards state that the MARK frequency should be the higher RF frequency,

Continued . . .

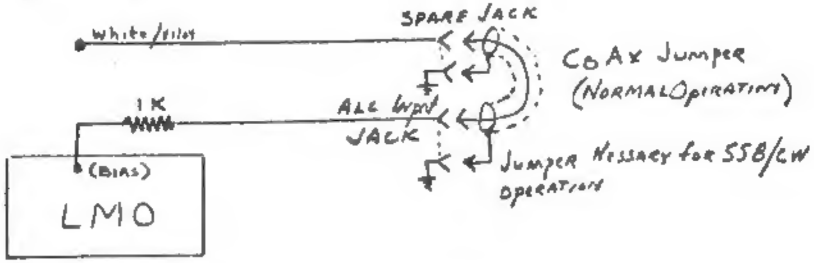
K8DKC REVISED W4MGT AFSK FOR SSB EXCITERS

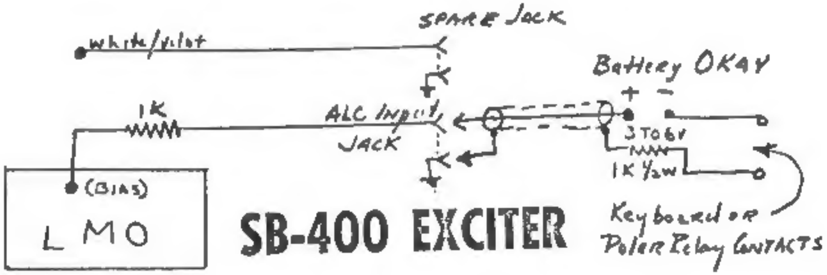


C_1 0.03 C_2 0.02 C_3 0.03 C_4 0.05 For various shifts



LINEAR MASTER OSCILLATOR


white/pilot
SPARE JACK
CoAx Jumper (NormalOpiratins)
1K
ALC Input JACK
Jumper Nessary for SSB/CW operation
(BIAS)
LMO



SB-400 EXCITER

FSK Keyers (Continued) . . .

and SPACE the lower frequency. It is possible to copy either correct FSK or "Up-Side-Down FSK" on many TU's, but many other amateurs can not copy reversed shift. It's fairly easy to either reverse the polarity of the DIODES or the DC to the diodes and reverse the shift direction. This reversed shift is usually the mark of a newcommer, Hi.

Another problem which causes poor copy is that of improper adjusted keying relays, where the armature is not correctly adjusted, or where the "throw from Mark to Space" contact permits a period of time where the FSK circuit does not see either a closed or open contact, but a value which is uncertain. Even those who key the FSK circuit directly, at times have problems from this same source. Hence proper adjustment of the keyboard contacts to provide a short transition from closed to open is best. Still another source of poor signals FSKwise is from poorly regulated DC which supplies the diode voltage. I have seen copied FSK signals and when watching the Scope pattern, see either the MARK start at one point on the scope and then drift to still another position. This with no keying. Most RTTYers have some means of monitoring their own FSK signals and can see this type of poor FSK. Another is caused by RF getting into the DC voltage of the diode keyer, causing a signal like the W6's used to get from 50 cycle AC. By-pass capacitors in the right place will correct this.

Several circuits have been printed which permit one to copy his own transmissions without use of the receiver, through a local DC loop from the TU. Three such circuits are those of W6ZH, W6NRM, and K8DKC. See Ref at end of article. While this has many advantages, it also has its draw backs. For example, it is possible to write on the keyboard, and not be on the air. You will find this out when you stand by for the other station and he is not there. Your CW key might have been left open, etc. It seems to this writer, best to copy "OFF-THE-AIR" so I will know first that I have a signal on the air, and if I have troubles, I will know it first . . . Of course to pay for this, one has to tune his own signal in on the receiver to make copy.

The material given here is more of a "State of the art," rather than new methods of FSK signal generation. Perhaps some of the odd sounding signals on the air can be improved to where they sound like the rest, Hi. -- Ed.

REFERENCES

Frequency Shift Exciter the Easy Way, W6CMQ, RTTY, Feb. 1953.

Method of Frequency Shift Keying, Crystal or VFO. W6ZH, RTTY, April 1953.

Getting Started on RTTY. W3PYW, RTTY, Oct. 1953.

FSKing a Collins 32V, W9TCJ, W6ZNU. RTTY, May 1954.

Taming the FSK of a VIKING VFO, W6OLC. RTTY, June 1954.

Modification of the VIKING VFO for FSK, K3GIF. RTTY, July 1954.

Keying System for RTTY Operation, W2TKO. RTTY, July 1955.

Modification of DX-100 for FSK, W6AEE. RTTY, Aug. 1955.

FSK Unit for the 32V, W0JRQ. RTTY, Nov. 1955.

HT-32 FSK Adapter, W6CQI. RTTY, June 1959.

FSK Conversion for KWM-2, K2YEL, K3GIF. RTTY, March 1962.

AFSK for SSB Transmitters, K8DKC. RTTY, Dec. 1962.

The W6NRM MARK IV TU, W6NRM. RTTY, March 1963.

The Mainline FSK System, K8DKC. RTTY, April 1963.

FSK Modification for SB-400 Exciter, WA6JZU. RTTY, Dec. 1964.

The W6ZH Hetrodyne TU, W6ZH. RTTY, July 1965.

Modification of the Collins 32-S1 and KWM-2, KR6BE. RTTY, Aug. 1965.

FSK Keyer for 32-V and 70-E Oscillators, Collins Radio. RTTY, Sept. 1964.

The W6NRM MARK V TU, W6NRM. RTTY, Oct. 1965.

The above list is far from complete, but shows typical circuits.

------O------

It is with regret that RTTY reports the death of one of our earlier members, George Clinton Jackson, W6RCM. George passed away on the 16th of April, and was buried on the 20th of April, 1966. We will miss him.

------O------

OFFICIAL BULLETIN NR 57 FROM ARRL HEADQUARTERS NEWINGTON, CONN., APRIL 28, 1966 TO ALL RADIO AMATEURS

By order dated April 25, 1966, the Federal Communications Commission has relaxed its requirements for filing a change of name or of mailing address only. Effective May 20, 1966 if only the name or the mailing address has changed, the amateur may send a letter to the FCC, Gettysburg, Pennsylvania 17325, setting forth the changes and keeping a copy of the letter with his license until the next renewal. Where the transmitter location is changed, or the trustee of a club station is replaced, formal modification on Form 610 with fee of two dollars is still required. Full details will appear in June QST. AR

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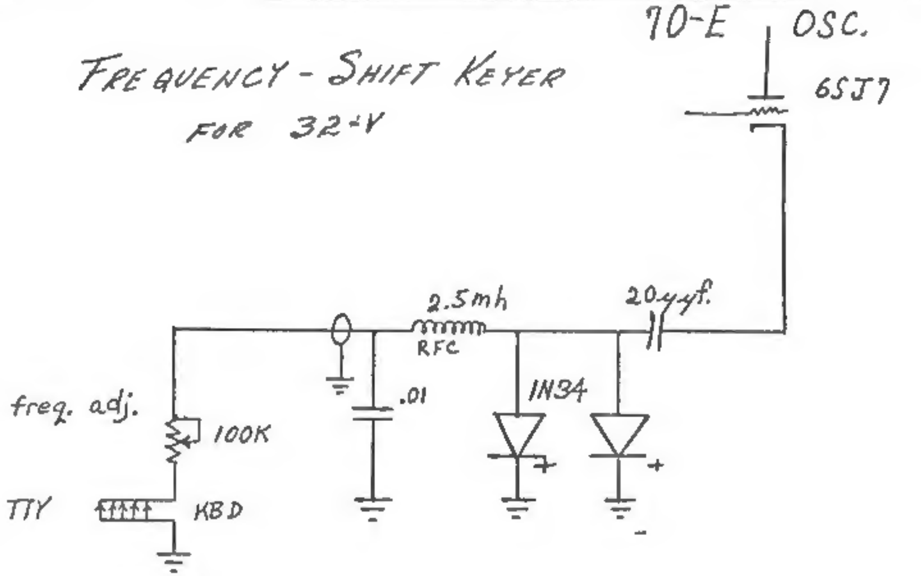
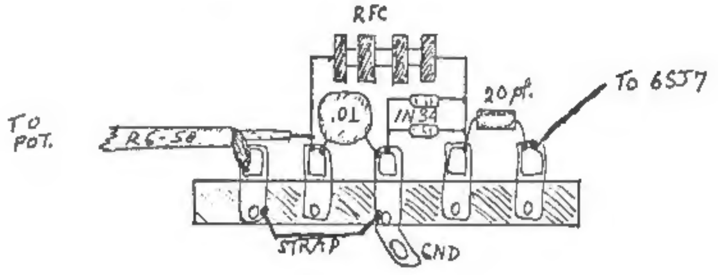
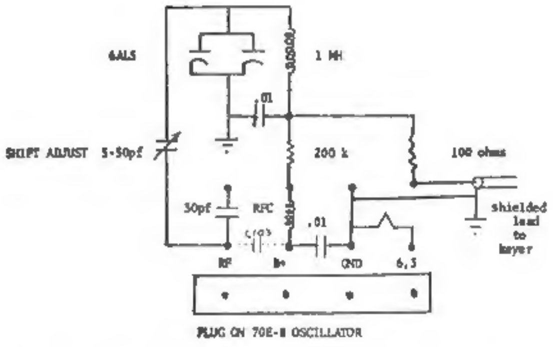




FSK ADAPTER UNIT FOR COLLINS 310 AND 32V TRANSMITTERS



The Collins 310 and 32V Transmitters use the type 70E-8 oscillator. The 6AL5 socket can be mounted in the top of the adapter which plugs into the oscillator. While making the conversion remove the condenser between the RF and B+ terminals(C103). The frame of the teletype machine should be well grounded.

COLLINS

HT-32 FSK ADDITION

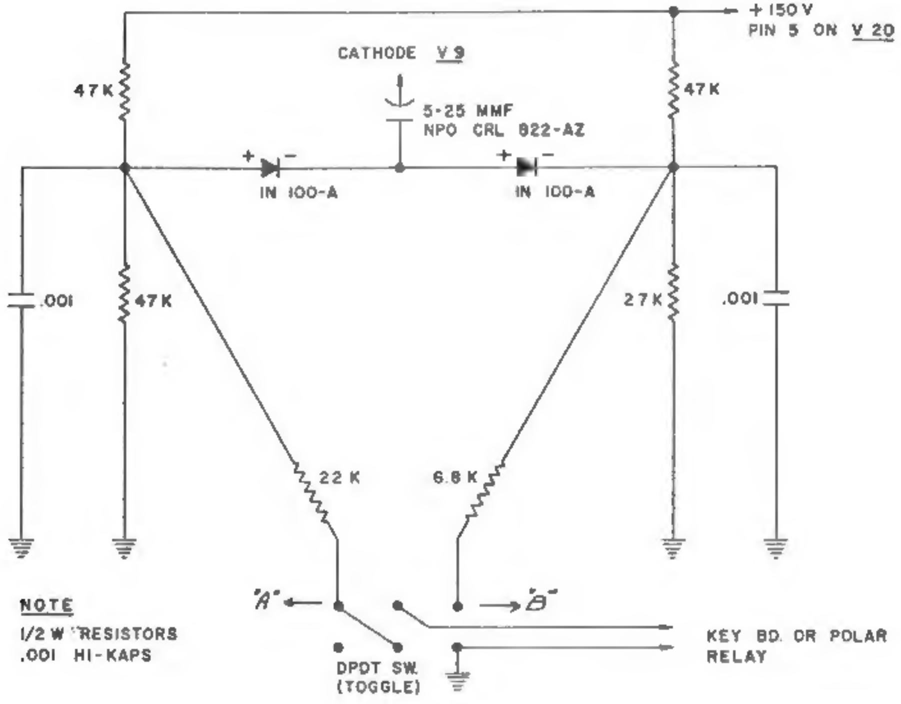
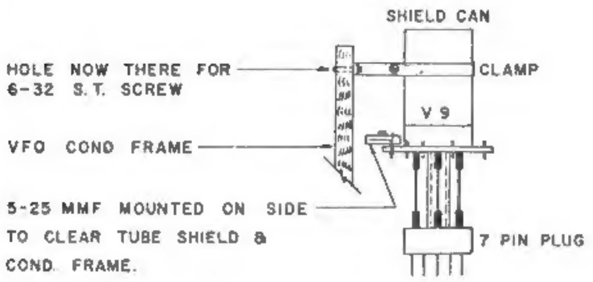
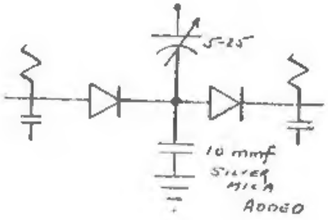


FIG. 1


SHIELD CAN
HOLE NOW THERE FOR 6-32 S.T. SCREW
CLAMP
V 9
VFO COND FRAME
5-25 MMF MOUNTED ON SIDE TO CLEAR TUBE SHIELD & COND. FRAME.
7 PIN PLUG

NOTE

7 PIN SOCKET & SHIELD.
1/8" FIBER-ROUND OR SQUARE FOR TERMINALS TO TIE RESISTORS-COND. & DIODES.



170 ~ SHIFT

ADDRESSES FOR RECIPIENTS OF MAIL FROM ANTARCTICA

All messages carry numbers only to expedite matters. This list is complete as of the end of the week of May 13, 1966 and as often as possible you will be supplied with new addresses as they develop. Sked time is now and probably will remain at 0815 GMT since that permits excellent conditions to prevail as a rule. Their signal strength is very strong and usually 'Humpteen' db's over S9. They use 850 cycle shift most of the time so that as many as possible can print them. They reduce shift upon request and when lightning is bad here in the valley I ask them to use 85 cycles or 170 cycles depending on the severity of the storm. They have expressed a desire several times to have as many stations participate as will in order to spread the workload. Please pass the word along that the frequency is either 7123 or 7127 and as a rule it is 7127. They are snuggled nicely in between two foreign broadcast stations and it works out slick as we only use two whistles, Hi! 73 and hope this information will be useful to the entire gang of RTTY subscribers.

W7ARS – Walt

067
MR. AND MRS. GEORGE A. BUEHL
610 Nassau Street
Bellmore, Long Island, New York 11710

068
MR. AND MRS. ROBERT H. BELL
5227 Ridgedale Ave.
Dallas, Texas 75206

069
ROBERTA WASSON
125 Venetian Garden
Gulfport, Mississippi

070
MRS. MARY A. HILLEBRAND
104 Tarpon Drive
Pittsburgh, Pennsylvania 15212

071
MRS. D. P. SMITH
7004 Red Robin Drive
Jacksonville, Florida 32210

072
MRS. ANNIE P. HILL
429 55th Street
Fairfield, Alabama 35067

073
JEAN RODDAY
11 Goldsmith Street
Jamaica Plain, Massachusetts 02130

074
MRS. WAYNE ADAMS
Route One, Box 110
Osceola, Arkansas 72370

075
MRS. ELAINE BRANDENBURG
225 West Center
Smithfield, Utah 84335

076
MRS. JAMES L. NORRIS
5611 Shasta Court
Concord, California

077
MRS. JOYCE TUCKER
Box 231
Weaverville, North Carolina

078
MRS. AL FRIERSON
3237 Edgewood Avenue
Fort Meyers, Florida

079
MRS. J. V. WAINWRIGHT
1625 First Street
Moss Point, Miss. 39563

080
MR. RONEY MORTON
1712 Evans Street
Morehead City, North Carolina 28557

081
MR. H. W. STOVER
15 West 310 Harvard
Elmhurst, Illinois 60126

082
MISS CAROL BARNES
15 Clifford Street
Rumford, Rhode Island

083
MRS. CHRISTINE CASADY
4 Grange Road, St. Mary's
Platt Kent, England Number Seven Oaks

084
MISS GAIL HOSTETLER
314 Tiogue Ave.
Coventry, Rhode Island

085
MISS ROSALIE SKOMCO
875 Locust Street
Fall River, Mass. 02720

076
MISS GINI ROLANDO
381 Oakland Ave., Apartment 28
Oakland, Calif.

087
MR. AND MRS. MELVIN ADAMS
100 Cedarcliff Road
Braintree, Mass. 02184

088
MISS ZOE ROBYN
c/o Mrs. Vern Konieczki
4718 North Hamilton Ave.
Chicago, Illinois 60625

089
MR. AND MRS. JACK O. CONKLIN
7508 East 111 Terrace
Kansas City, Missouri 64134

RTTY-DX

EDWARD S. CLAMMER, K3GIF
5940 Avon Drive, Bethesda, Maryland 20014

The Second Annual Alexander Volta RTTY Contest . . .

The famed SSB and RTTY Club of Como, Italy are the sponsors of the new contest of the same name which is scheduled for 0200 GMT, May 21 to May 23. Bands: 80, 40, 20, 15 and 10. The messages must contain zone number in addition to the usual facts. KH6, KL7 and VO are considered separate countries, additional to the ARRL countries list.

Scoring: All two way contacts will receive the number of points in the exchange table indicated for the zone being worked. See Exchange Points table for further information. Stations may be contacted only once per band. A multiplier of unity is given for each country, including your own, contacted, country multiplier is effective for the first time you work the country in question on any band, only. Total score is obtained by multiplying total exchange points times number of country credits.

EXAMPLE:
Summary of Log of W6AEE (Zone 3), May 21, 1966

STN. WKD.	BAND	ZONE #	COUNTRY CREDIT	EXCHANGE POINTS (SEE TABLE)
K3GIF	20	5	1	11
I1ORS	20	15	1	28
VK2EG	20	30	1	35
I1ORS	15	15	0	28
W1BGW	15	5	0	11
VK3KF	15	30	0	35
W6NRM	20	3	0	2
VE4BJ	20	4	1	8

Country credits **(4)** times **(158)** Exchange points=Total **(632)** points

The SSB and RTTY Clubbers are to be congratulated on coming up with such an original and precise means of assuring fairness in scoring. Zonal maps are to be found in amateur callbooks or may be purchased from: Radio Amateur Callbook, 4844 Fullerton Ave., Chicago, Ill. 60639 for one dollar postpaid. These show the location of all forty zones around the world.

The promulgation of such a unique scoring system with its table of exchange points took the Italian fellows some time so notification was not received in time to make the May issue. The information is furnished mainly therefore, to enable those who participated in the contest to determine their scores and if the rules stand for next year to give us a chance to study the new system and comment up it to the authors if we so desire.

This type of scoring of RTTY contests will find the knowledgable RTTY DX man doing a lot more listening and a great deal less CQ DXing. East Coast USA stations (zone 5) missing a chance to work Orbra, EL2F would have to work four KP4 stations to make up for the loss. So it is mighty important not to be sending when the rarer countries are coming thru. So it should work to make a "quieter" contest. I consider that a really worthwhile goal. My personal thanks are to Lou, I1ORS, for his work in airmailing a lot of the rules for the Volta to known active stations in order to get them out in time. Also thanks to Lou, I1ORS, for furnishing this office with a late list of BARTG contest winners. If you wonder why we list such an odd number of winners—keep wondering.

POS.	CALL LETTERS	FINAL SCORE
1	W2RUI	90,720
2	DJ6ZBA	81,060
3	I1ORS	78,702
4	K8MYF	78,660
5	W1GKJ	71,368
6	G3MWI	69,498
7	K5OLU	69,190
8	W3KDF	68,554
9	VE3AYL	57,176
10	I1KG	56,160
11	K3GIF	53,162

This is a truly fine showing. Skipper showed us once more who the top contestant is and made a whopping score beating out his nearest competitor (DJ6ZBA) by over 9700 points. It was by a wide margin the highest score ever posted for the BARTG or similar RTTY contest. Gwen, VE3AYL, made by far the finest showing ever by an XYL and possibly the best Canadian showing to date. You can see it was a fine contest and up to the high BARTG standards. A doff of the editor's hat to Skipper, Josef, Lou and of course to Gwen.

Backscatter

Bud tells me that Eric, VK3KF and Cas, KA9AK has worked crossband (10 to 15 meters) around 0100 GMT. Eric reports that beacon JA1IGY running fifty watts on 29,000 Kcs. comes thru well in Australia between

Continued . . .

RTTY-DX (Continued) . . .

0200 and 0400 GMT. 29,000 Kcs. is Cas' RTTY calling frequency.

Don, HH9DL, is putting Haiti on the air with RTTY from his QTH on its North Coast. Please QSL him via P.O. Box 70-B, Port Au Prince.

Brag tapes serve mighty little purpose in this life excepting to cause more QRM than anyone really needs. They rank with the taped QSL card in achieving a new high in 'kid stuff'. The bands are crowded and the RTTY channels are small enough without their being messed up by the running of the above trash. It's important that we cooperate with one another and use our bands in wiser ways. Want to know how I feel about brag tapes, QSL tapes and pictures via RTTY sent over the air on ham bands? I'M AGIN 'EM!! Any more questions? CW ID follows.

de K3GIF 73.

B.A.R.T.G.

The 1966 Spring B.A.R.T.G. RTTY Contest was even more successful than the first event last year. Activity on all bands was tremendous and the QRM particularly on 20 m. was really something to hear! The C.W. men kept well out of the way. A particularly pleasing feature was the appearance of rare RTTY countries, which enabled contestants to increase their country multiplier.

W2RUI, with the fantastic score of 90,720 points, is the undisputed leader, but credit is due to all concerned for their hard work. There is no doubt that to keep in the top ten, requires perserverance, sanity, and the ability to go without sleep for long periods!

The B.A.R.T.G. Committee are particularly pleased that the system of scoring has shown once again that equal weight can be given to stations in different Continents. It must be admitted, however, that the Asian and Australasian stations do suffer from a lack of operating 'available' time, no doubt due to the relative lack of activity in that part of the world. However, we are sure that all who entered, enjoyed the Contest, and our congratulations go to the leaders.

One feature that does elicit comment is that VE3AYL, Gwen, appeared in the Contest for the first time and scored a historic place in the top ten. Congratulations Gwen. Do you suggest that we should have a Contest devoted entirely to the fairer sex?

More countries were on the air than submitted logs, as is evident in the check of the scores that was carried out. Otherwise we are certain that the list would have been a lot longer.

It would be remiss of us not to comment on some of the outstanding presentations. Don, K8MYF, sent along his usual immaculate log and K5OLU was also deserving of special mention. Thank you indeed. It makes the task of checking all that much easier.

All Continents were represented on the Contest instead of the absent Asia of last year, and thank you to HLGKF for giving some people that extra Continental multiplier that was very badly needed. KW6DS also showed up for the Contest and submitted a very creditable first time score. In Europe, OK1KUL moved up into 14th place in the very first Contest in which he has partaken.

We think that the list speaks for itself. Thank you again for all the hard work and thanks from myself (G2HIO) to G6CW and G3MP and my wife, for their help in checking the final figures.

COMMENTS RECEIVED

Five new countries—wish the Contest announcements could precede the rat race by at least a month—W2RUI.

Thanks again for a good contest—WB6RXM.

I enjoyed the Contest this year even more than last year—K8JTT.

It was an excellent Contest with plenty of activity, good conditions and plenty of DX—K3GIF.

Very fine business indeed, waiting for the next—I2ROL.

Suggest that extra points be awarded for narrow shift. Contest very enjoyable — W1OUG.

Had a lot of fun in the Contest—W0HAH.

PA Transformer went up in smoke! — G3LDI.

Civilised hours complete with NAAFI breaks were worked—G3EJF.

Sure enjoyed the first Contest on RTTY, only wish that I had built up a better T.V. in time—hi—VP9BY.

VERY FB CONTEST—QSO'd HI8RR for a first, he was so excited I couldn't begin to explain the rules—W3KDF.

Thanks for a nice Contest, it is a very enjoyable and wonderful event—K8MYF.

Copied many Europeans HA5KBB S9 on 20 metres, EL2F also 20 over nine, but a pile up—W6AEE.

I will now start clearing paper out of the shack—PA0FB.

Thanks for my first RTTY Contest. I promise to take part in the future—OK1KUL.

See you next time—G3MWI.

Conditions on all bands generally poor — consistently strong stations, OK1KUL and HA5KBB — VK3KF.

I am looking forward with great anticipation to next year's Contest—K5OLU.

Very fine Contest, had a ball of a time doing more listening than anything else!—K2YEO.

This was one of the best Contests it's been my pleasure to operate—'Murphy's Law' left me alone—WA6WGL.

Continued . . .

POSITION	STATION	COUNTRIES 10M	15M	20M	40M	80M	TOTAL	CONTINENTS	CONTACTS	POINTS
1.	W2RUI	—	12	28	5	3	48	WAC 6	97	90,720
2.	DJ6ZBA	—	6	20	5	11	42	WAC 6	73	81,060
3.	I1ORS	1	5	22	4	7	39	5	120	78,702
4.	K8MYF	1	13	24	5	2	45	5	130	78,660
5.	W1GKJ	—	11	23	5	5	44	5	103	71,368
6.	G3MWI	—	2	20	4	7	33	WAC 6	93	69,498
7.	K5OLU	—	10	19	4	4	37	WAC 6	125	69,190
8.	W3KDF	—	11	24	5	2	42	5	80	68,544
9.	VE3AYL	—	8	19	3	3	33	5	78	57,176
10.	I1KG	—	4	26	—	—	30	WAC 6	72	56,160
11.	K3GIF	—	7	22	8	—	37	5	50	54,316
12.	WA6WGL	—	9	16	5	1	31	WAC 6	99	51,956
13.	DL1VR	—	7	18	—	6	31	4	73	46,682
14.	OK1KUL	—	—	15	2	10	27	5	72	46,440
15.	VE2HL	—	8	19	1	4	32	3	77	42,996
16.	LA6J	—	1	19	2	4	26	WAC 6	46	42,952
17.	W4CQI	—	—	21	3	3	27	5	64	38,016
18.	W6LDF	1	7	15	1	—	24	WAC 6	61	37,104
19.	XE1YJ	—	7	7	3	3	20	4	93	34,440
20.	PY2CQ	—	—	21	—	—	21	5	57	32,802
21.	K8YJQ	—	3	18	2	2	25	5	46	32,700
22.	KW6DS	—	4	15	—	—	19	5	62	30,780
23.	W86PB	—	—	17	—	4	21	4	90	25,788
24.	VE3IR	—	9	10	—	1	20	5	31	25,724
25.	KH6EM	—	4	9	—	2	15	5	70	25,500
26.	K2YEQ	—	—	19	—	—	19	5	40	24,776
27.	W1OUG	—	7	12	—	—	19	5	27	22,762
28.	W0HAH	—	4	14	—	2	20	4	41	20,360
29.	G3CIO	—	—	10	—	5	15	5	35	20,130
30.	SM5KV	—	—	16	—	—	16	4	38	18,880
31.	W8CAT	—	8	8	—	2	18	4	28	17,784
32.	VK3KF	—	—	14	—	—	14	5	19	16,660
33.	W6AEE	1	6	5	3	4	19	3	56	16,264
34.	HL9KF	—	—	14	—	—	14	4	31	15,400
35.	G6CW	—	3	5	1	3	12	4	24	14,972
36.	WB2GPP	—	3	14	2	—	19	2	25	12,046
37.	I1ORL	—	—	13	—	—	13	3	30	11,388
38.	WB6RXM	—	5	6	1	1	13	3	33	10,218
39.	G5ZT	—	2	9	—	1	12	3	24	9,984
40.	F3PI	—	—	10	—	—	10	4	13	9,060
41.	F2LV	1	2	9	—	—	12	3	16	8,730
42.	PA0FB	—	3	3	—	7	13	2	24	8,320
43.	VK2EG	—	—	9	—	—	9	4	15	8,550
44.	W1ACW	—	—	9	—	1	10	3	23	7,180
45.	W2FAN	1	6	3	1	2	13	2	28	6,760
46.	G3LDI	—	—	7	2	—	9	3	13	6,570
47.	W1WL	—	1	10	1	—	12	2	16	6,336
48.	F8KI	—	1	8	—	—	9	3	16	6,624
49.	G2HIO	—	1	7	—	—	8	3	18	6,076
50.	VO1BL	—	—	9	—	—	9	2	19	5,310
51.	LA6OI	—	—	9	—	—	9	2	15	4,878
52.	K4AWQ	—	—	6	—	—	6	3	10	3,960
53.	W7QCN/0	—	2	3	1	—	6	2	18	2,760
54.	G6JF	—	—	8	—	—	8	1	12	2,432
55.	VP9BY	—	—	4	—	—	4	2	18	2,320

MULTIPLE OPERATOR

POSITION	STATION	10M	15M	20M	40M	80M	TOTAL	CONTINENTS	CONTACTS	POINTS
1.	K8JTT	—	4	14	2	4	24	5	64	31,728

Comments Received (Continued) . . .

Il y avait beaucoup de stations et beaucoup de DX sur l'air—F2LV.

Thanks for the fun — worked seven new countries—W1GKJ.

It was a great pleasure for me to join your Contest, hope this will not be the last — DJ6ZBA.

I was very proud to work Europe on 80, even though the contacts counted the same as the ones 200 miles away with the U.S.A.—VE2HL.

This was one occasion where 'ladies don't come first', but it was my first RTTY Contest and had a lot of fun—Gwen Burnett, VE3AYL.

Just want to give a point to my friends—W2WL.

My first RTTY Contest and while I didn't do so well, certainly enjoyed it—K4AWQ.

This was my first RTTY Contest and I sure enjoyed it—W7QCN/0.

Hope to hear more of the G boys on RTTY, tell them to swing their beams my way!—VK2EG.

Best result ever had in any RTTY Contest, got W.A.C. during the Contest—LA6J.

The test was grand and certainly enjoyable —WA6LDF.

Had a wonderful time and am looking forward to next year, if I am still on Wake Island —KW6DS.

Time as usual was divided between Contest and Oscar—ZL1WB.

CHECK LOGS RECEIVED FROM:
PY2SO. SM2CQC. ZL1WB.
UQ2–22317/UD6.

The log from Alex. E. Wilks in Azerbaijan, USSR, listed 49 contacts of 29 stations in 14 countries, the first list from USSR. SWL for an RTTY Contest.

It seems that we will now have to organise a separate listeners Contest for the same period !

—— O ——

The Dallas Amateur Radio Club, MARS, and the Dallas Times Herald newspaper, have a very efficient, workable, arrangement to get messages to servicemen in VIET NAM.

A model 19 machine, on loan from the club, is set up in the lobby of the newspaper office in downtown Dallas. 15 word messages are solicited thru the medium of the paper. The messages are punched in tape, and on the page printer by a member of the Times Herald staff, who also deliver the tape and one copy of the text to a local amateur operator who is also a member of MARS.

The taped portion of the message is sent out via MARS at 60 WPM.

L. F. WANJA, W5EJV
804 Shady Lane
Dallas, Texas 75208

090
CHIEF WM. HORNER
ASA Det. "Charlie"
Naval Weather Research Facility
Naval Air Station, Norfolk, Virginia 23511

091
MR. AND MRS. L. W. EDMONSON
AND JOHN
9912 Debbie Drive
El Paso, Texas

092
MARY SENTER
10327 Southwest Eastridge Street
Portland, Oregon

093
MISS PIA KOCK HENRIKSEN
Toftholm Alle Eleven (11)
Hellerup, Denmark

—— O ——

The other day I received that very nice certificate "QCA" from the BARTG (Nr. 9). Will have to get busy on the next twenty-five now. I have a total of 46 worked but short about five cards as yet. In the Issac Walton tradition, some of the big ones that got away were! FC – HC – HH – 5X5 – VP3 – KC4 – ZL –. Although I printed them at one time or other. No QSO's.

Things are sure getting crowded on twenty anymore while fifteen goes begging even with condx wide open. Have been running some tape there, but so far not much action.

Although I have said it before, I'll say it again, I sincerely appreciate the wonderful job you fellows are doing with the publication for our benefit. Best wishes and 73 —

de
JOHN, W3KDF

Vic, Keith, Henry, Dusty, Elmer W0MPF and others you know were all at the recent Dayton ham-vention. I thought it was about the best one they have had. Burt Jaffe spoke on how to set up a RTTY station. He only had an hour, but I thought he covered the general subject rather well. Vic spoke for two hours and demonstrated his automatic RTTY-to-CW-to-RTTY equipment and displayed a Model 1200 and the audio spectrum scope display for the 1200. He also had his modified Model 15 there to show how easily they can be altered at very little expense for automatic non-overline and auto CR-LF. He also had the special plastic cover for it that deadens the sound level to less than that of a Model 28! — K8DKC

—— O ——

FOR SALE: 400 cycle precision electronic tuning fork, two tube (6AU6), you furnish tubes and filament/B plus, guaranteed; modify to 425 cycles for 850, 2125, 2975 cycle output, with schematic, postpaid, $4.00; 88 mhy toroids 5 for $2.00; magnetic AFSK or chadless perforated TEST Tape, each $2.00; model 14, 15 sync motors, $5.00; model 28 sync motors $15.00; Kleinschmidt sync or governed motors $10. All motors freight collect. K5BQA, 11040 Creekmere, Dallas, Texas 75218.

EXCHANGE POINTS TABLE

	CORRESPONDENT zone																																							
YOUR zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
1	2	14	10	13	16	18	22	20	25	30	36	37	39	21	22	19	20	17	11	25	29	29	22	22	16	28	25	31	39	35	14	36	25	29	34	39	40	47	44	15
2	14	2	15	8	7	16	16	12	16	23	24	30	30	12	14	16	19	20	19	19	25	31	26	30	28	35	35	40	50	50	25	47	14	21	21	28	33	36	37	6
3	10	15	2	8	11	9	13	14	18	21	28	28	30	26	28	27	29	27	21	32	37	39	32	31	24	37	33	40	43	35	11	32	29	35	35	42	48	50	52	20
4	13	8	8	2	3	8	10	8	12	18	22	25	27	19	21	23	26	26	22	26	33	37	32	34	30	40	38	44	52	44	20	40	21	28	26	33	40	41	44	14
5	16	7	11	3	2	9	9	6	10	17	20	24	25	18	20	22	26	26	24	35	32	38	33	35	31	41	40	45	54	46	22	41	19	27	24	31	38	39	42	13
6	18	16	9	8	9	2	4	7	10	12	19	19	21	27	29	31	34	33	29	34	40	46	40	40	33	46	42	49	47	38	17	32	28	36	30	37	44	43	48	22
7	22	16	13	10	9	4	2	4	6	8	15	15	17	26	29	31	35	36	33	33	40	47	42	44	38	50	46	53	49	40	22	34	26	34	26	33	40	38	44	22
8	20	12	14	8	6	7	4	2	5	11	15	18	19	22	24	27	31	32	30	29	35	42	38	42	37	47	46	51	54	44	24	38	21	30	23	30	38	36	41	13
9	25	16	18	12	10	10	6	5	2	8	10	14	15	23	25	29	33	35	34	29	35	43	41	45	41	50	50	55	52	45	28	38	21	30	20	27	35	32	38	21
10	30	23	21	18	17	12	8	11	8	2	9	7	9	31	33	37	41	43	41	36	42	51	49	52	45	58	52	54	44	37	28	31	28	36	24	29	38	31	38	29
11	36	24	28	22	20	19	15	15	10	9	2	9	7	26	28	33	36	41	43	30	34	42	45	51	52	49	55	49	42	41	37	35	22	29	16	20	28	23	29	27
12	37	30	28	25	24	19	15	18	14	7	9	2	3	35	37	41	45	49	48	39	42	49	53	58	50	52	52	48	37	33	32	27	31	37	34	27	33	27	33	34
13	39	30	30	27	25	21	17	19	15	9	7	3	2	33	35	40	43	48	49	37	39	46	50	56	53	50	52	46	34	34	35	29	29	34	21	24	30	24	30	34
14	21	12	26	19	18	27	26	22	23	31	26	35	33	2	3	6	10	14	18	7	14	21	19	25	27	27	30	32	42	49	34	55	5	10	15	19	21	26	26	6
15	22	14	28	21	20	29	29	24	25	33	28	37	35	3	2	5	9	13	18	6	11	18	17	23	27	25	29	30	39	47	36	54	6	7	15	18	19	25	24	8
16	19	16	17	23	22	31	31	27	29	37	33	41	40	6	5	2	4	8	13	6	10	15	12	18	22	21	24	26	36	42	33	49	10	9	20	21	21	27	25	9
17	20	19	29	26	26	34	35	31	33	41	36	45	43	10	9	4	2	5	12	7	8	12	8	14	19	17	20	22	32	38	32	45	14	10	22	22	20	27	23	12
18	17	20	27	26	26	33	36	32	35	43	41	49	48	14	13	8	5	2	7	12	12	12	6	11	14	15	16	20	30	35	29	40	13	15	27	28	24	31	27	14
19	11	19	21	22	24	29	33	30	34	41	43	48	49	18	18	13	12	7	2	18	19	16	10	10	9	16	15	20	30	32	21	36	23	21	33	34	30	38	33	16
20	25	19	32	26	35	34	33	29	29	26	30	39	37	7	6	6	7	12	18	2	6	14	14	20	26	21	26	25	34	43	39	49	8	3	15	16	15	22	20	12
21	29	25	37	33	32	40	40	35	35	42	34	42	39	14	11	10	8	12	19	6	2	9	11	17	24	16	21	20	28	37	40	43	14	6	18	16	11	19	15	19
22	29	31	39	37	38	47	46	42	43	51	42	49	46	21	18	15	12	12	16	14	9	2	6	10	18	17	13	11	21	29	36	35	22	14	26	22	15	22	16	24
23	22	26	32	32	33	40	42	38	41	49	45	53	50	19	17	12	8	6	10	14	11	6	2	6	13	8	12	14	24	30	31	37	22	16	29	26	21	28	22	20
24	22	30	31	34	35	40	44	42	45	52	51	58	56	25	23	18	14	11	10	20	17	10	6	2	8	6	6	10	20	24	26	30	28	22	35	33	25	32	25	25
25	16	28	24	30	31	33	38	37	41	45	52	50	53	27	27	22	19	14	9	26	24	18	13	8	2	13	9	15	23	30	18	27	32	28	41	40	33	40	33	25
26	29	35	37	40	41	46	50	47	50	50	49	52	50	27	25	21	17	15	16	21	16	7	8	6	13	2	6	5	16	22	31	29	29	21	33	29	21	27	20	29
27	25	35	33	38	40	42	46	46	50	52	55	52	52	30	29	24	20	16	15	26	21	13	12	6	9	6	2	7	15	18	25	25	34	27	40	35	27	32	26	30
28	31	40	40	44	45	49	53	51	55	54	49	48	46	32	30	26	22	20	20	25	20	11	14	10	15	5	7	2	10	17	31	24	34	25	36	30	22	26	19	34
29	39	50	43	52	54	47	49	54	52	44	42	37	37	42	39	36	32	30	30	34	28	21	24	20	23	16	15	10	2	9	15	32	42	33	39	31	24	24	20	44
30	35	50	35	44	46	38	40	44	45	37	41	33	34	49	47	42	38	45	32	43	37	29	30	24	30	22	18	17	9	2	24	7	51	42	47	40	33	32	29	48
31	14	25	11	20	22	17	22	24	28	28	37	32	35	34	36	33	32	29	21	39	40	36	31	26	19	31	25	31	15	24	2	22	39	42	46	53	52	56	51	28
32	36	47	32	40	41	32	34	38	38	31	35	27	29	55	54	49	45	40	36	49	43	35	37	30	27	29	25	24	32	7	22	2	57	48	47	42	38	34	33	50
33	25	14	29	21	19	28	26	21	21	28	22	31	29	5	6	10	14	18	23	8	14	22	22	28	32	29	34	34	42	51	39	57	2	9	10	14	18	22	23	10
34	29	21	35	28	27	36	34	30	30	36	29	37	34	10	7	9	10	15	21	3	6	14	16	22	28	21	27	25	33	42	42	48	9	2	13	12	12	18	16	16
35	34	21	35	26	24	30	26	23	20	24	16	34	21	15	15	20	22	27	33	15	18	26	29	35	41	33	40	36	39	47	46	47	10	13	2	7	15	15	19	20
36	39	28	42	33	31	37	33	30	27	29	20	27	24	19	18	21	22	28	34	16	16	22	26	33	40	29	35	30	31	40	53	42	14	12	7	2	8	8	11	24
37	40	33	48	40	38	44	40	38	35	38	28	33	30	21	19	21	20	24	30	15	11	15	21	25	33	21	27	22	24	33	52	38	18	12	15	8	2	7	5	28
38	47	36	50	41	39	43	38	36	32	31	23	27	24	26	25	27	27	31	38	22	19	22	28	32	40	27	32	26	24	32	56	34	22	18	15	8	7	2	6	32
39	44	37	52	44	42	48	44	41	38	38	29	33	30	26	24	25	23	27	33	20	15	16	22	25	33	20	26	19	20	29	51	33	23	16	19	11	5	6	2	32
40	15	6	20	14	13	22	22	18	21	29	27	34	34	6	8	9	12	14	16	12	19	24	20	25	25	29	30	34	44	48	28	50	10	16	20	24	28	32	32	2

HORSE TRADES

X **TRADE:** 60-67-100 WPM 3 speed gearshift for model 28. W0DNW, 2801 Wright Ave., North Platte, Nebraska 69101.

FOR SALE: Teletype Model 28ASR (Automatic send and receive) Beige color. Has typing reperforator. Also 28 ROTR (Receive only typing reperforator) Both in excellent condition, used only about 30 hours since NEW. Selling as PACKAGE DEAL TO BEST CASH OFFER. Located Los Angeles, California area. Phone 964-5030 after 6:30 P.M. or on weekends.

FOR SALE: Times Corporation Facsimile equipment. Includes Receiver and Transmitter with manual on receiver. Excellent working condition and appearance. $70.00 for both units. Purchaser pays shipping costs. Will consider trade. W1OUG, 150 Brook Run Lane, Stamford, Conn. 06905.

FOR SALE: TT 63A/FGC Teletype repeater regenerator, its capable of accepting TTY signals in Audio (on-off) form or in direct current form (polar and neutral) complete with tubes and cable, like new, excellent $32.50 each. Atlantic Surplus Sales, 250 Columbia Street, Brooklyn, N.Y. 11231.

WANTED: Manuals for Technical Material Co. Regenerator SFO-2, MXB 227AB, FRXD 16Lu253. Also wanted, LM frequency meter with modulation or SCR Model. Complete with right calabration book. K0SKK, 9340 Riggs, Overland Park, Kansas 66212.

FOR SALE: DX Antenna Farm consisting of HY-GAIN 204BA 4-element 20 meter beam, 153BA 3-element 15 meter beam, and Ham-M rotator mounted on a Tristao 50 ft. tilt-over galvanized tower. Used only 6 months. $325.00. Teletype model 19 $100.00. WA6JYJ, 456 Lakeview Way, Redwood City, California. Phone (415) 366-6184.

WANTED: Manual TM-2217 for test set TS-383 (DXD). K4BUR, 9718 Braddock Road, Fairfax, Va. 22030.

FOR SALE: Complete ready-to-go RTTY outfit. Model 26 page printer with table, Twin Cities TU., local loop control circuit in cabinet, Mainline shifter for FSKing your VFO, the works, $100.00. You pick-up. K4ZQR, 409 Kaelin Drive, Louisville, Ky.

FOR SALE: New Teletype paper; standard 8½" roll, packed 12 to box $8.00. 10 rolls 11/16" reperf tape $3.50. Model 101, 26, 14, 15 gear. Best prices. M14 typing reperf. $45.00. Gonset Tri-band converter $6.00. HQ-129X $60.00. Wanted: 811A, 812A, 5894. Teletype part #111535, can sleeve for M26. D-104 mike, matchbox. Send for list. W2DLT, 348R Essex Street, Stirling, N.J. 07980.

FOR SALE: Two each, typing units Teletype code # LP-3. Two each, Electrical service units, Teletype code # LESU-4. Three each, Teletype Corp. manuals, BULLETIN 216B. General description and theory of operation Model 28 printer. Three each, Teletype Corp., manuals BULLETIN 217B. Adjustments and lubrication of 28 page printer set LP, LK, LB, LAC. Three each Teletype Corp. manuals BULLETIN 235B, Adjustments and lubrication Model 28 Transmitter distributor. LXD, LXDB, LXDC. Two each Teletype Corp., BULLETIN 249B, General description and theory of operation Model 28 perf. transmitter LAK, LPE, LAAC. Three each BULLETIN 250B Adj. & lub Model 28 TD, LAK, LPE, LTPE, LAAC. Two each BULLETIN 258B Desc. and operation model 28 TD, LXD, LXDB, LXDC. KL7BAJ, Airport and Dale Road, Fairbanks, Alaska 99701.

WANTED: Information or kit for carriage return, line feed for model 19 and 26 printers. Also cathode follower stage, receiving unit for CV-57 Converter. W8MSG, 3479 Kersdale Road, Cleveland, Ohio (24).

FOR SALE: Model 15, excellent condition $30.00. WU Model 14 complete with tapes $15.00. F.O.B. A. Clark, W4IYT, 41 Lenape Drive, Miami Springs, Florida 33166.

FOR SALE: Model 19 Teletype, excellent condition, TD, Perforator, Rectifier, Sync Motor, Holding magnet. $135.00. W4-TRJ, 824 South Lincoln Street, Arlington, Va. 22204.

FOR SALE: CV-89A – good condition $175.00. Boehme repeater, new, $35.00. Scope tuning modules for CV-89, new – complete, $30.00. W3LST, 228 Plummer Street, Oil City, Pa. 16301.

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